CLAIMS

What is claimed is:

1. An anti-collision system for use within a motorized vehicle, comprising:

(a) means for sensing the urgency with which the brakes of said vehicle are being activated and generating a signal in response thereto; and

(b) means for rearwardly communicating sufficiently urgent levels of braking to other drivers in response to said signal crossing a predetermined threshold.

2. An anti-collision system as recited in claim 1, wherein the means for sensing the urgency of said brake activation comprises a pressure sensor responsive to the pressure with which the brake is being applied.

3. An anti-collision system as recited in claim 1, wherein the means for sensing the urgency of said brake activation comprises an acceleration sensor responsive to the acceleration to which the brake pedal is being subjected.

4. An anti-collision system as recited in claim 1, wherein the means for rearwardly communicating urgent levels of braking to other drivers comprises a visual indicator which is capable of being seen from behind said vehicle.

5. An anti-collision system as recited in claim 1, wherein the means for rearwardly communicating urgent levels of braking to other drivers comprises a remote

communications link, such as radio-frequency, operably coupled to a visual indicator within the vehicles of the other drivers, upon which urgent levels of braking of said first vehicle are capable of being displayed.

6. An anti-collision system for reducing the probability of rear-end vehicular collisions between a first vehicle and vehicles following said first vehicle, comprising:

(a) a sensor configured for attachment to the braking system of said first vehicle and configured to generate a signal in response to the rapidity with which the brakes are applied by the driver of said first vehicle; and

(b) a controller operably connected to receive said signal from said sensor and configured to activate an event indicator upon said signal crossing a predetermined threshold, said event indicator configured for recognition by drivers within one or more of said following vehicles.

7. An anti-collision system as recited in claim 6, wherein the rapidity of brake application is characterized by said sensor in response to changes in applied brake pedal pressure.

8. An anti-collision system as recited in claim 6, wherein said sensor is mounted to the brake pedal.

9. An anti-collision system as recited in claim 6, wherein said sensor is mounted within the linkages connecting to the brake pedal.

10. An anti-collision system as recited in claim 6, wherein the rapidity of brake application is characterized by said sensor in response to brake pedal accelerations.

11. An anti-collision system as recited in claim 6, wherein the event indicator comprises a light source.

12. An anti-collision system as recited in claim 11, wherein the light source is modulated on and off by said controller to increase recognition by the drivers of the other vehicles.

13. An anti-collision system as recited in claim 11, wherein the event indicator comprises the reverse lights of said first vehicle.

14. An anti-collision system as recited in claim 6, further comprising a communications link operably connected with said controller, through which the event indicator located on another, second, vehicle is capable of being activated by the transmission of an event signal by said controller through said communications link .

15. An anti-collision system as recited in claim 14, wherein the communications link is configured with a communications protocol in which senders and receivers are synchronized to the order of event occurrence.

16. An anti-collision system as recited in claim 14, wherein said communications link comprises a transmitter operably connected to said controller and capable of generating an event signal to remotely activate an event indicator contained within vehicles following said first vehicle.

17. An anti-collision system as recited in claim 16, wherein the transmitter is oriented substantially for rearward projection from said first vehicle such that the associated event signal generated by said first vehicle is directed for reception by vehicles following said first vehicle.

18. An anti-collision system as recited in claim 16, wherein the controller is configured to provide event signal communication of a single event as periodic transmissions wherein short-term short-term signal interference with other of said anti-collision systems is prevented.

19. An anti-collision system as recited in claim 18, wherein the period between transmissions within the periodic transmission of an event signal is temporally offset such that event signals generated from other of said vehicles in response to a

simultaneous event are not subject to continued interference with one another, but are shifted apart so as not to continue overlapping.

20. An anti-collision system as recited in claim 19, wherein the temporal offset is restricted to allow event transmission within slotted intervals which are based on an event being generated, wherein event transmissions synchronize themselves in relation to an event being generated.

21. An anti-collision system as recited in claim 14, wherein said controller is configured to encode severity data within the event signal.

22. An anti-collision system as recited in claim 14, wherein said controller is configured to encode identification data allowing event signals generated from different vehicles to be distinguished from one another.

23. An anti-collision system as recited in claim 14, wherein said communications link comprises a receiver operably connected to said controller, the combination responsive to an event signal generated by another of said anti-collision systems, or a device so configured to transmit signals of that format, and capable of activating an event indicator for recognition by the driver of said first vehicle.

24. An anti-collision system as recited in claim 23, wherein said combination of receiver and operably connected controller is configured to provide for selective regeneration of received signals which are retransmitted to additional vehicles.

25. An anti-collision system as recited in claim 24, wherein the selective regeneration is controlled by the transmission of a regeneration limiter value encoded within the transmitted event signal.

26. An anti-collision system as recited in claim 25, wherein the regeneration is controlled by a count value encoded into the event signal as the regeneration limiter, said count value set to a first value upon first transmission from said first vehicle and is subsequently altered by a system responsive to said first transmission within an additional vehicle, wherein the system is configured to further regenerate the signal until the count value reaches a final value whereupon receipt of the event signal with the final count value prevents further event signal regeneration.

27. An anti-collision system as recited in claim 24, wherein the controller is configured to provide for selective regeneration in response to the severity of the event being communicated.

28. An anti-collision system as recited in claim 14, further comprising a crash detection sensor operably connected to said controller and configured to generate a crash event in response to detection of a crash.

29. An anti-collision system as recited in claim 28, wherein said crash detection sensor comprises an acceleration sensor capable of sensing levels of acceleration commensurate with impact collisions.

30. An anti-collision system as recited in claim 28, wherein said crash detection sensor comprises a signal generated by airbag circuitry within the vehicle which is activated in response to airbag deployment.

31. An anti-collision system as recited in claim 14, further comprising a swerve sensor operably connected to said controller, said swerve sensor generating a swerve signal which is capable of initiating event signal generation by said controller in response to a sufficient amount of detected swerve and of conditioning the response of the controller.

32. An anti-collision system as recited in claim 14, further comprising a direction sensor operably connected to said controller such that a direction of travel for said first vehicle may be encoded within event signals being communicated.

33. An anti-collision system as recited in claim 14, wherein the event indicator located in the second vehicle provides a visual indication to the driver of said second vehicle, such as a visual indication on the dashboard.

34. An anti-collision system as recited in claim 14, wherein the event indicator located in the second vehicle provides an audio alert to the driver of said second vehicle.

35. An anti-collision system as recited in claim 14, wherein the event indicator located in the second vehicle is responsive to the severity level encoded within the event signal such that feedback may be provided to the driver of said second vehicle by the event indicator whereupon the driver is alerted to the severity of the event which has taken place.

36. An anti-collision system as recited in claim 14, wherein the event indicator is configured for indicating roadway condition messages which are received as event signals from roadside devices and emergency vehicles equipped to generate roadway condition event signals.

37. An anti-collision system as recited in claim 36, wherein the event indicator configured for indicating roadway condition messages is a visual display comprising at least one array of display elements adapted for displaying text and/or graphics.

38. An anti-collision system as recited in claim 37, wherein the visual display further comprises a compass display capable of displaying vehicle heading.

39. An anti-collision system as recited in claim 14, further comprising a speed sensor connected to the said controller, wherein event signal generation is fully or partially responsive to the output of the speed sensor, such that braking activity which occurs within slow moving vehicles, as in parking lots adjacent to a roadway, does not unnecessarily alert drivers on the roadway.

40. An anti-collision system as recited in claim 14, further comprising a GPS positioning system connected to said controller for enhancing event qualification by embedding position data within the transmitted event signals and for qualifying received event signals by comparing the position of the vehicle issuing the event with the vehicle within which the event signal has been received.

41. An anti-collision system as recited in claim 14, further comprising a range detection device operably connected to said controller and capable of determining the distance to the vehicle being followed such that the controller may detect impending crash situations and respond to events in a manner consistent with the amount of following distance that exists.

42. An anti-collision system as recited in claim 14, wherein the communication link is configured for transmitting event signals which are capable of being received within a properly configured call box unit, or similarly configured receiver, that is configured to receive event signals and communicate significant event information over a communication channel to personnel, such as may be dispatched to the scene.

43. An anti-collision system as recited in claim 42, further comprising a wireless telephone connected to the controller and which is capable of automatically dialing out a predetermined emergency number and providing speakerphone capability so that the status of occupants can be determined by emergency personnel, the automatic dialing being triggered by an event of sufficient severity, such as a crash of the vehicle to which the wireless telephone is installed.

44. An anti-collision system as recited in claim 14, wherein upon receipt of an event signal over the communications link the controller is capable of generating a signal to the cruise control for releasing the pressure on the accelerator pedal, so that the car can begin to decelerate immediately upon receipt of the event signal.

45. An anti-collision system as recited in claim 14, further comprising an error detection circuit which monitors the operation of said controller and is capable of shutting down portions, or the entire, circuit of the controller in response to detected errors.

46. An anti-collision system as recited in claim 45, wherein the error detection unit connected to said controller further comprises status inputs and digital memory within which vehicle status information is logged until such time as the vehicle containing said controller is involved in a crash, whereupon the data which has been logged may be accessed to determine vehicle conditions prior to the crash.

47. An anti-collision system as recited in claim 14, further comprising an automatic mute circuit connected to said controller and capable of muting the audio output of the sound system of said vehicle in response to the controller receiving an event signal of sufficient severity, such that the driver can be alerted to approaching emergency vehicles which are generating an event signal and to severe roadway conditions requiring the driver's full attention.

48. An anti-collision system as recited in claim 14, further comprising an automatic braking mechanism connected to said controller which is capable of activating the vehicle's brakes, wherein said controller is configured for activating the automatic braking mechanism detecting a sufficient alert condition.

49. An anti-collision system as recited in claim 6, further comprising an accelerator pedal sense input to said controller, wherein said controller is capable of discerning the level of acceleration to which the vehicle is subject, and can additionally

discern changes to acceleration, such as an abrupt release of accelerator pedal pressure which may be indicative of a process of hard braking, said controller being configured for conditioning outputs, such as hard braking indicators, communication links, and mechanisms for automatically engaging the brakes in response thereto.

50. An anti-collision system as recited in claim 6, further comprising a light signal controller which is in wired electrical connection with said controller and itself connects to a plurality of vehicle lights, wherein the light signal controller responds to signals from the controller by activating and deactivating selected lights within said vehicle, such that the use of the light signal controller eliminates the necessity of providing individual wiring to each of the plurality of vehicle lights.

51. An anti-collision system as recited in claim 50, wherein the light signal controller is integrated within a light module containing a plurality of elements, such as individual LEDs whose state of activity is selectively controlled by the light signal controller.

52. An anti-collision system as recited in claim 6, wherein said pressure transducer is a load cell whose output is generated across a Wien bridge.

53. A method of decreasing response time for a driver following a braking vehicle, so as to decrease the number of rear-end vehicle collisions, comprising:

early detection of brake pedal activation, prior to brake engagement; and

activation of an alerting signal so that drivers following said braking vehicle are provided with additional time to respond to the braking action.

54. A method as recited in claim 53, further comprising:

ascertaining the amount of braking action that the driver is attempting to apply; and

activating an alert signal in response to the detection of hard braking, the alert signal being separately distinguishable from a conventional braking indication, so that drivers following said vehicle are warned of that the driver is attempting to brake hard.

55. In a roadside call box which is capable of providing communication between its roadway location and emergency personnel, wherein the improvement comprises:

(a) a receiver capable of registering event signals generated by the transmitters within vehicles that are experiencing or responding to roadway events;

(b) a control circuit operatively connected to said receiver, wherein the control circuit is capable of activating an appropriate outcall to emergency personnel when the registered event signal is of sufficient severity; and

(c) an encoder capable of converting the information about the received event signals into a signal compatible with the outcall circuitry of the call box, such as a voice signal, so that the event signal information is communicated to emergency personnel

that may then respond to the roadside events which have been registered.

56. A method of decreasing response time for a driver following a braking vehicle, so as to decrease the number of rear-end vehicle collisions, comprising:

ascertaining the amount of braking action that the driver is attempting to apply; and

activating an alert signal in response to the detection of hard braking, the alert signal being separately distinguishable from a conventional braking indication, so that drivers following said vehicle are warned that the driver is attempting to brake hard.

57. A method as recited in claim 56, wherein the separately distinguishable alert signal comprises is a rear facing illumination source.

58. A method as recited in claim 57, wherein the illumination source is the reverse indicator light of the vehicle.

59. A method as recited in claim 58, wherein modulation of the reverse indicator light is selected as a further indicator of the hard braking condition.